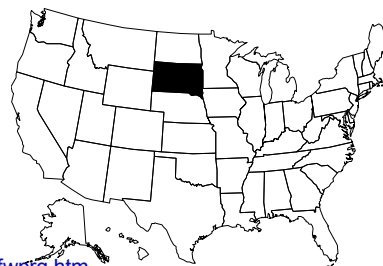


SOUTH DAKOTA

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Program Description

Currently, the South Dakota Department of Environment and Natural Resources (SD DENR) Water Resources Assistance Program (WRAP) collects biological data in addition to chemical and physical parameters for TMDL assessments. These bioassessments are useful in determining the impact of contaminants as well as detecting chronic water quality impairments that may not be discovered by ambient chemical and physical grab samples. Of the 9,937 total stream miles, approximately 4 miles have been biologically assessed (60 sites assessed; 150 meters per site). SD DENR has not yet established biological criteria for use in water quality standards.

The Water Resource Assistance Program evaluates benthic macroinvertebrate community structure in streams using both the EMAP protocol and USEPA's Rapid Bioassessment Protocols (RBPs) in conjunction with assessments of stream habitats. All biological samples are identified to the lowest possible level of taxonomic resolution. Biological data are entered into the STORET database and are summarized using multimetric indices and descriptive statistics. SD DENR intends to use the biological data to identify potential reference sites for determining the condition of water quality and the integrity of the biological community. WRAP is beginning to sample periphyton communities to determine if they are a better biological indicator of water quality.

Documentation and Further Information

Stueven, E., A. Wittmuss, and R.L. Smith. 2000. *Standard Operating Procedures for Field Samplers. Revision 4.0, January 2000.* South Dakota Department of Environment and Natural Resources, Water Resource Assistance Program. Pierre, SD.

Ecoregion Targeting of Impaired Lakes in South Dakota (May 2000)

The 2000 South Dakota Report to Congress, 305(b) Water Quality Assessment,
http://www.state.sd.us/denr/Documents/SD_2000_305b.pdf

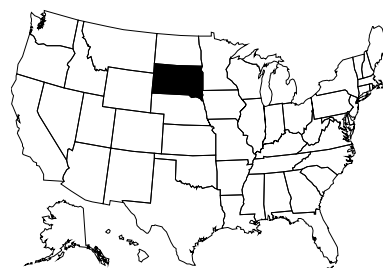
The 1998 South Dakota 303(d) Waterbody List and Supporting Documentation,
[http://www.state.sd.us/denr/303\(d\)/98sd303d.pdf](http://www.state.sd.us/denr/303(d)/98sd303d.pdf)

South Dakota Surface Water Quality Standards, <http://legis.state.sd.us/rules/rules/7451.htm>

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Programmatic Elements

Uses of bioassessment within overall water quality program	<input checked="" type="checkbox"/>	problem identification (screening)
	<input checked="" type="checkbox"/>	nonpoint source assessments
	<input checked="" type="checkbox"/>	monitoring the effectiveness of BMPs
	<input checked="" type="checkbox"/>	ALU determinations/ambient monitoring
	<input checked="" type="checkbox"/>	promulgated into state water quality standards as biocriteria
	<input type="checkbox"/>	support of antidegradation
	<input type="checkbox"/>	evaluation of discharge permit conditions
	<input checked="" type="checkbox"/>	TMDL assessment and monitoring
	<input type="checkbox"/>	other:
Applicable monitoring designs	<input checked="" type="checkbox"/>	targeted (i.e., sites selected for specific purpose) (<i>special projects, specific river basins or watersheds</i>)
	<input type="checkbox"/>	fixed station (i.e., water quality monitoring stations)
	<input type="checkbox"/>	probabilistic by stream order/catchment area
	<input type="checkbox"/>	probabilistic by ecoregion, or statewide
	<input type="checkbox"/>	rotating basin
	<input type="checkbox"/>	other:

Stream Miles

Total miles	9,937
<i>(determined using RF3, National Hydrography Database, and state based determination)</i>	
Total perennial miles	1,932
Total miles assessed for biology*	3.73
fully supporting for 305(b)	n/a
partially/non-supporting for 305(b)	n/a
listed for 303(d)	n/a
number of sites sampled (<i>on an annual basis</i>)	~60
number of miles assessed per site	~.093
	(150 meters)

*South Dakota reports only chemical data in 305(b) reports and 303(d) listings. Currently, biological data is only collected during TMDL assessments. South Dakota's DENR plans to use the biological data to locate reference sites and conditions based on ecoregions as well as to establish biocriteria.

Aquatic Life Use (ALU) Designations and Decision-Making

ALU designation basis	Warm Water vs. Cold Water	
ALU designations in state water quality standards	Five designations: Cold Water Permanent, Cold Water Marginal, Warm Water Permanent, Warm Water Semi-Permanent, Warm Water Marginal	
Narrative Biocriteria in WQS	No formal/informal numeric procedures exist to support narrative biocriteria	
Numeric Biocriteria in WQS	none	
Uses of bioassessment data in integrated assessments with other environmental data (e.g., toxicity testing and chemical specific criteria)	<input checked="" type="checkbox"/>	assessment of aquatic resources
	<input type="checkbox"/>	cause and effect determinations
	<input type="checkbox"/>	permitted discharges
	<input checked="" type="checkbox"/>	monitoring (e.g., improvements after mitigation)
	<input checked="" type="checkbox"/>	watershed based management
Uses of bioassessment/biocriteria in making management decisions regarding restoration of aquatic resources to a designated ALU	none	

Reference Site/Condition Development*

Number of reference sites	~31 total	
Reference site determinations <i>Under development</i>	<input type="checkbox"/>	site-specific
	<input type="checkbox"/>	paired watersheds
	<input type="checkbox"/>	regional (aggregate of sites)
	<input checked="" type="checkbox"/>	professional judgment
	<input type="checkbox"/>	other:
Reference site criteria	Under development. Criteria used for defining reference sites include: EMAP protocol, habitat, chemical, and aquatic life.	
Characterization of reference sites within a regional context <i>Under development</i>	<input type="checkbox"/>	historical conditions
	<input checked="" type="checkbox"/>	least disturbed sites
	<input type="checkbox"/>	gradient response
	<input type="checkbox"/>	professional judgment
	<input type="checkbox"/>	other:
Stream stratification within regional reference conditions <i>Under development</i>	<input checked="" type="checkbox"/>	ecoregions (or some aggregate)
	<input type="checkbox"/>	elevation
	<input type="checkbox"/>	stream type
	<input type="checkbox"/>	multivariate grouping
	<input type="checkbox"/>	jurisdictional (i.e., statewide)
	<input type="checkbox"/>	other:
Additional information <i>Under development</i>	<input type="checkbox"/>	reference sites linked to ALU
	<input type="checkbox"/>	reference sites/condition referenced in water quality standards
	<input checked="" type="checkbox"/>	some reference sites represent acceptable human-induced conditions

*The responses above characterize how reference sites will most likely be determined in the future. Twenty-seven sites have been assessed in South Dakota as reference for the EMAP data set. South Dakota's DENR samples ~4 sites as reference and will be working on establishing formal reference sites and criteria for streams and rivers. Lake reference sites and criteria have already been developed.

Field and Lab Methods

Assemblages assessed	<input checked="" type="checkbox"/>	benthos (100 - 500 samples/year; single season, multiple sites - not at watershed level)
	<input type="checkbox"/>	fish
	<input checked="" type="checkbox"/>	periphyton (<100 samples/year; single season, multiple sites - not at watershed level)
	<input type="checkbox"/>	other:
Benthos		
sampling gear	D-frame, multiplate, rock baskets; 500 - 600 micron mesh	
habitat selection	multihabitat	
subsample size	300 count	
taxonomy	combination	
Periphyton		
sampling gear	natural substrate: brushing/scraping device (razor, toothbrush, etc.) artificial substrate: microslides or other suitable substratum	
habitat selection	multihabitat	
sample processing	chlorophyll a / phaeophytin, taxonomic identification	
taxonomy	species level	
Habitat assessments		
visual based, quantitative measurements, hydrogeomorphology; performed with bioassessments		
Quality assurance program elements		
standard operating procedures, quality assurance plan, periodic meetings and training for biologists, taxonomic proficiency checks, specimen archival		

Data Analysis and Interpretation

Data analysis tools and methods	<input checked="" type="checkbox"/>	summary tables, illustrative graphs
	<input type="checkbox"/>	parametric ANOVAs
	<input type="checkbox"/>	multivariate analysis
	<input checked="" type="checkbox"/>	biological metrics (<i>multimetric index under development</i>)
	<input type="checkbox"/>	disturbance gradients
	<input type="checkbox"/>	other:
Multimetric thresholds		
transforming metrics into unitless scores	25 th percentile of reference population, natural breaks	
defining impairment in a multimetric index	25 th percentile of reference population	
Evaluation of performance characteristics	<input type="checkbox"/>	repeat sampling
Not currently evaluated	<input type="checkbox"/>	precision
	<input type="checkbox"/>	sensitivity
	<input type="checkbox"/>	bias
	<input type="checkbox"/>	accuracy
Biological data		
Storage	STORET	
Retrieval and analysis	Statistica, EDAS	